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Portable data carrier with a removable mini smart card **ART 34 AMDT**

The present invention relates to a portable data carrier with at least one removable mini smart card according to the preamble of claim 1.

In known mobile radio systems, for example a GSM mobile radio system, the SIM (subscriber identity module) can be present in two different card formats. Mobile phones intending frequent change of the SIM usually employ the ID-1 card format since the large card simplifies handling during a change. For mobile phones intending a change of SIM only rarely or not at all, or for very small mobile phones, the so-called plug-in SIM in the ID-000 format has become established. In order to make it easier to provide substantially prepersonalized smart cards for mobile radio use, smart cards for mobile radio use are normally provided with a punching permitting the plug-in (mini smart card) to be broken out without much trouble.

From the German print DE-A 40 07 221 it is known to dispose a mini smart card in the ID-000 format in a card with the standard ID-1 format, the mini smart card being surrounded by a punching, i.e. a free punch, with only one or more bars being retained to hold the mini smart card in the card body.

European patent application EP-A 0 495 216 furthermore discloses an ID card with a microprocessor, the microprocessor with its contact surfaces being disposed on a standard smart card (ID-1 format) at the place fixed by the standard. The microprocessor and its contact surfaces are surrounded on three sides by a free punch in the form of a plug-in (mini smart card in the ID-000 format) while the fourth side of the carrier has hinge-like notching.

This makes it possible for the standard card to be used with the plug-in not broken out in mobile radio devices which intend frequent change of the SIM, while the break-out plug-in is used as a "mini smart card" in smaller mobile radio devices or devices usually not intending a change of SIM.

From US-PS 5,581,065 it is known to glue a plug-in in the ID-000 format into the gap of a card body. The plug-in can be detached from the card body for use in a mobile radio device which uses the mini smart card. The advantage of this assembly

is that when the plug-in is taken out no bars remain that might alter the exact placement in the mounting of a mobile radio device.

With increasing miniaturization of mobile radio devices, however, the problem arises that even the mini smart card in the ID-000 format is still too large.

It is therefore the problem of the invention to provide a smart card with a plug-in which permits further reduction in size of the mini smart card, all card formats being reliably separable from each other or it being readily possible to remove the plug-in from the remaining card body, while at the same time plug-in and card body form a stable unit in case the plug-in stays in the remaining card body.

This problem is solved starting out from the features of the preamble of claim 1 by the characterizing features of said claim.

Advantageous embodiments of the invention are stated in the dependent claims.

The basic idea of the invention is that, in particular for very small mobile radio devices, a chip module is disposed in the card body by means of an adhesive bond, the adhesive bond being detachable in order to optionally remove the chip module from the card body. The inventive solution permits the space required for the SIM in the mobile radio device to be reduced to what is absolutely necessary, namely the chip module.

An advantageous embodiment of the invention provides for the chip module to be disposed, for better handling, in a gap of a mini smart card which is smaller than the usual ID-000 format used in mobile radio devices at present.

According to another advantageous embodiment of the invention, it is provided that the reduced mini smart card is disposed again by means of a detachable adhesive bond in the gap of a further mini smart card, for example in the ID-000 format. This permits use in conventional mobile radio devices as well.

In the following, the invention will be explained in more detail with reference to Figs. 1 and 2, in which:

Fig. 1 shows a plan view of the inventive portable data carrier, and

Fig. 2 shows a cross section through said data carrier.

Fig. 1 shows portable data carrier 1 with mini smart card 2 disposed therein. Said mini smart card can advantageously have the ID-000 format, but larger or smaller ones are of course likewise possible. Within the mini smart card there is further miniaturized plug-in 3. Portable data carrier assembly 1 also contains IC module 41 with contact surfaces 4. Without limiting the generality, card body 1 of Fig. 1 contains plug-ins of different sizes which are each disposed in a gap and glued detachably to the bottom of said gap. Only one of the possibilities shown can of course also be present, for example only one gap with module 41, or a plurality of card sizes can be realized.

Fig. 2 shows schematically a cross section through the portable data carrier assembly. Here, too, one sees the embedding of different mini smart cards 2, 3 and module 41. Module 41 is connected with mini smart card 3 by means of an adhesive bond at the bottom of the gap. The adhesive bond can be produced for example by an adhesive film disposed at the bottom of the gap or on the underside of the module. Such a connection also exists between mini smart card 3 and mini smart card 2, and between mini smart card 2 and portable data carrier assembly 1.

Figs. 1 and 2 show, without limiting the generality, portable data carrier 1 with mini smart cards and a module in altogether three different sizes and thicknesses. It is of course also possible to insert module 41 directly into the gaps of card body 1 which is adapted to the module in terms of size, or to provide further mini smart card formats.

The advantage of the inventive data carrier is that the different plug-ins also have different thicknesses so that the miniaturization relates not only to the horizontal dimensions but also to the vertical ones. In particular for a plug-in size in the ID-000 format one can also use a conventional punching in order to obtain a plug-in conforming to standards.